

ANNUAL REPORT
OF THE
PUBLIC PRINTER
1934

G. P. O.
PROOF SECTION

UNITED STATES GOVERNMENT PRINTING OFFICE

A. E. GIEGENGACK, Public Printer



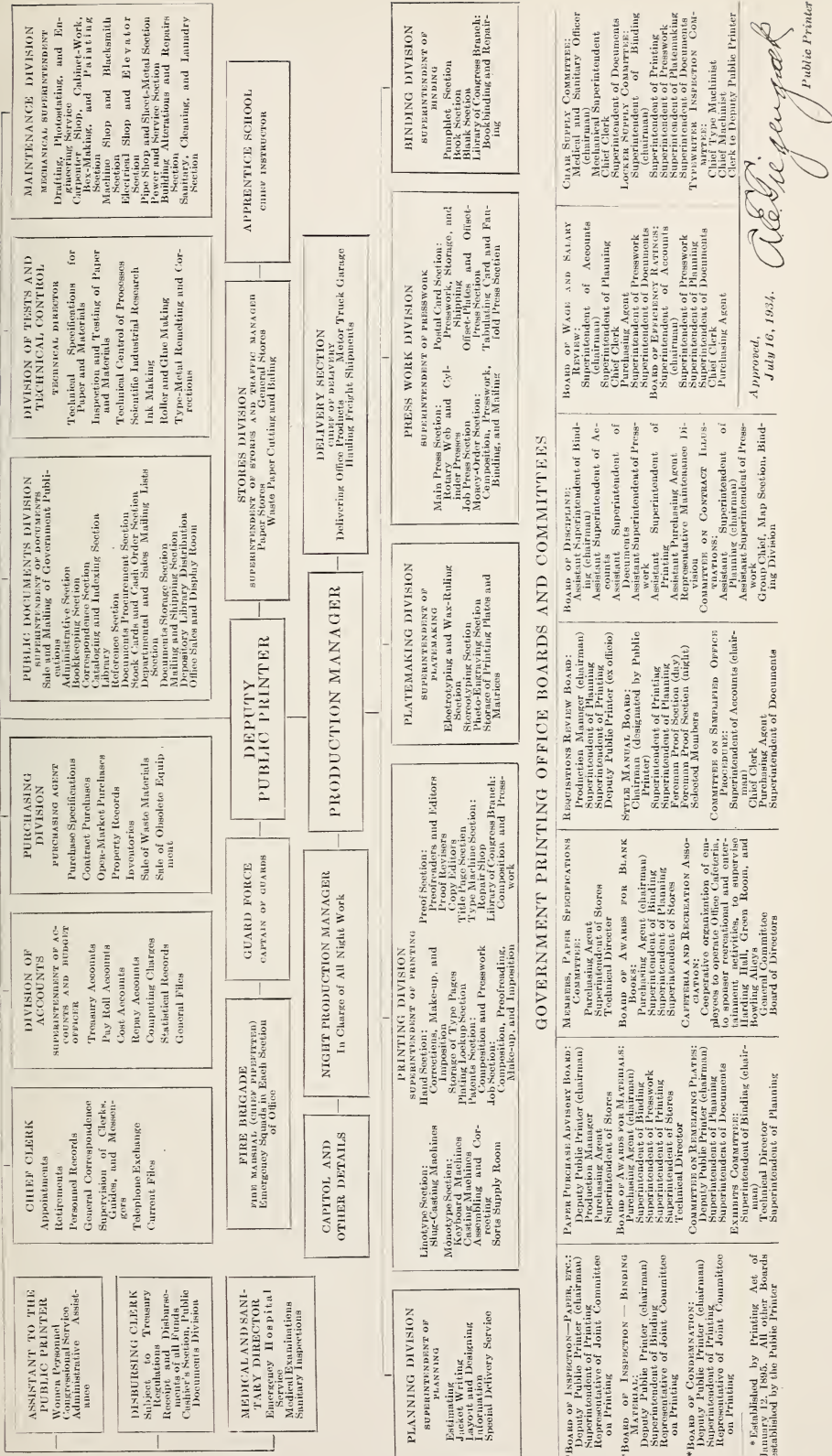
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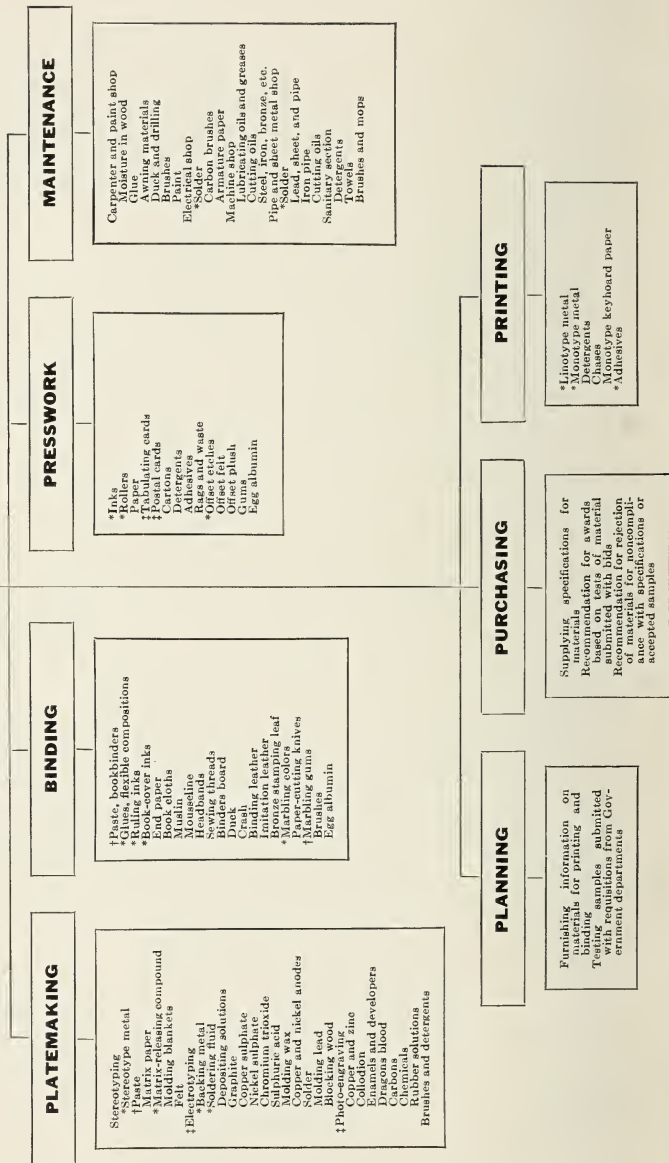
PUBLIC PRINTER



UNITED STATES GOVERNMENT PRINTING OFFICE

DIVISION OF TESTS AND TECHNICAL CONTROL

ITS FUNCTIONS AS RELATED TO THE VARIOUS MANUFACTURING UNITS



*Materials manufactured in the Technical Division. †Materials produced under technical control by the respective divisions. ‡All or in part under technical control. The quality of all materials listed is maintained by the use of technical specifications in their purchase and by laboratory tests to insure that deliveries comply with such specifications. On addition to technical-control activities, research is conducted on problems relating to the work of the office. The results of the research work are published as Government Printing Office technical bulletins for the benefit of the industry.

ANNUAL REPORT OF THE PUBLIC PRINTER

OFFICE OF THE PUBLIC PRINTER,
Washington, D.C., January 3, 1935.

To the Congress of the United States:

In compliance with law, the Public Printer herewith presents his report of the work of the Government Printing Office for the fiscal year ended June 30, 1934. The present Public Printer, having taken office July 2, 1934, must necessarily draw his report from available records of the Office rather than personal contact with its work.

Public Act 381, Seventy-second Congress, approved February 28, 1933, appropriated \$1,750,000 as a working capital to the Public Printer, but provided that \$450,000 thereof be immediately available for congressional printing and binding in fiscal year 1933, thus reducing the working capital for 1934 to \$1,300,000. The same act also provided that \$1,000,000 of the compensation deductions from employees of the Government Printing Office, not including Office of Superintendent of Documents, was to be credited to the 1934 congressional printing and binding fund, thus requiring the Public Printer to collect the \$1,000,000 from sales of printing and binding to departments and use it for congressional printing.

Public Act 268, Seventy-third Congress, approved May 30, 1934, made available for 1934, \$500,000 of the unexpended balance of the 1933 appropriation.

The act of March 28, 1934, Public 141, Seventy-third Congress, reduced the working hours per week from 44 to 40; and, as it continued the 48 hours' pay per week, labor costs increased a flat 10 percent. This added cost, definitely fixed by law, necessarily was covered in charges to the various Government activities ordering printing and binding, and under a provision in the same law these activities were permitted to apply for funds to cover the increased cost. Under this same provision, upon request of the Public Printer, there was transferred to the credit of the 1934 working capital and made available for congressional printing the sum of \$90,635 to absorb the increased cost of labor due to the 40-hour week.

The financial set-up for the working capital, 1934, was as follows:

Original appropriation	\$1, 750, 000. 00
Made available (from above) for 1933.....	—450, 000. 00
Made available for 1934 from unexpended balance of 1933.....	+500, 000. 00
Appropriation under sec. 21 (e), Public Act 141, 73d Cong., to compensate for increase in labor cost on congressional printing and binding due to the operation of the 40-hour week in last 3 months of fiscal year 1934.....	+90, 635. 00
Net available appropriation	1, 890, 635. 00
Repayments to working capital for printing and binding fur- nished the various Government activities.....	10, 059, 225. 94
Total available working capital.....	11, 949, 860. 94
Appropriation for Office of Superintendent of Documents.....	712, 800. 00
Miscellaneous funds.....	5, 354. 85

The combined resources available for expenditure by the Public Printer during the year were \$12,668,015.79.

Obligations incurred totaled \$12,604,826.03, leaving an unobligated balance of \$63,189.76, subject to over- or under-adjustments on approximately \$1,600,000 obligations outstanding on July 1, 1934.

Deposits to miscellaneous receipts in the Treasury during the year totaled \$394,720.31. This included receipts from sale of waste paper, condemned machinery and materials, and the excess of sales price over cost of printing documents sold to the public. The latter item shows an increase of approximately \$150,000, due to higher prices charged the public by requirement of law.

Compensation to employees during the year totaled \$8,651,117.36, which included \$303,304.69 deposited to credit of employees in retirement fund through the required 3½ percent deduction.

Compensation deduction in fiscal year 1934 totaled \$1,281,413. This was brought about by a pay cut of 15 percent for 9 months and 10 percent for 3 months. One million dollars of this deduction was credited to working capital for charging congressional printing and binding, \$47,727.80 remained in appropriation for salaries, Office of Superintendent of Documents, and \$233,685.20 was returned to the Treasury for credit to surplus fund.

Payments for paper totaled \$2,356,510.41, for miscellaneous material and supplies \$599,521.54, and for lithographing and engraving \$81,287.45.

Congressional printing and binding charges amounted to \$2,890,-635, an increase of \$190,635 over previous year.

Members of Congress paid \$38,867.17 for reprints of speeches; this was a decrease of \$1,578.82 from previous year.

Principal charges during the year were as follows: Post Office Department, including postal card and money order printing,

\$1,340,097.22; Patent Office, \$928,477.70; Treasury Department, \$901,529.22; and Department of Agriculture, \$715,855.72. Other departments paid over \$500,000 each for their printing.

Work for the various emergency activities cost approximately \$2,000,000.

Publications printed during the year totaled 125,670,342 copies.

All work connected with the Congressional Record during the year cost \$698,645.88.

Congress was charged \$353,932.10 for the printing of its public bills, resolutions, and amendments.

Specifications of patents and trade marks cost \$776,573.62, and Official Gazette and annual indexes, \$150,323.71.

Blanks, notices, cards, schedules, etc., printed during the year totaled 3,749,085,209 copies, costing \$3,816,498.38. The number of copies exceeded those in previous year by over a billion.

Blank paper purchased on Government Printing Office contracts and furnished to various Government activities on their requisitions cost \$545,355.31, an increase of \$132,436.57 over fiscal year 1933.

Charges for Farmers' Bulletins during the year amounted to \$77,442.56 and covered 6,591,632 copies.

Postal cards printed totaled 1,528,518,300, requiring 8,342,521 pounds of stock. Number of cards increased 238 million (18 percent) over previous year.

Money-order blanks totaled 220,817,000 copies, for which the Post Office Department paid \$150,410.55.

Annual reports printed in fiscal year 1934 for various Government activities made 13,205 type pages, with 358,940 copies, costing \$149,126.23.

The cost of printing hearings for the various committees of House and Senate was \$503,581.19, for 1,014,148 copies, with 160,377 type pages.

Miscellaneous printing and binding for congressional committees cost \$471,151.83.

This was the busiest year in the history of the Office. In addition to the work done for Congress, the congressional committees, executive departments, and independent establishments, a large amount of printing was required by the 54 emergency activities.

CONGRESSIONAL PRINTING

The Record.—Printing for Congress constituted a major problem. During the last session the daily average number of pages of the Congressional Record was 94.32 for 139 issues, which was, with one exception, the highest ever attained, and the issue of June 16, with 302 pages and a requirement of 23½ tons of paper, was, also with one exception, the largest single issue in the history of this publication.

The Senate was responsible for 5,504 pages and the House for 4,874 pages. The appendix made 2,732 pages, constituting about 20 percent of the total number of pages, which was 13,110. Approximately 1,000 tons of paper were used for the Record during the session.

Over 16,000 curved stereotype plates were required for the Record and 1,124 for the biweekly index. Duplicate sets of plates for necessary press combinations greatly increased the number, there being 3,009 additional plates cast. This made a daily average of 115.24 plates cast per issue.

Bills.—During the last session bills, too, were voluminous, the number for both Houses being 6,414. As the bills progressed through Congress, 8,310 additional prints were necessary, making a total of 14,724 bill prints. The regular appropriation bills are printed at least eight times. The subcommittee prints of some of these bills made over 400 pages.

Reports.—Like the bills on which they were made, reports formed a large part of the morning-delivery work. For the 139 days of the session, they totaled 3,106—for the House 1,795 and for the Senate 1,311—with a daily average of 22.4.

Calendars.—The Senate and House Calendars are printed daily. The House Calendar is not only the largest but it increases in size from the opening day of the session to the final edition, which this year made 262 pages. The committee calendars are printed at frequent intervals, some becoming quite bulky by the end of the session. The following table shows the volume of calendar work for the session :

	<i>Pages</i>
House-----	15, 168
Senate-----	5, 428
House committees-----	2, 291
Senate committees-----	3, 973
<hr/>	
Total-----	26, 860

Documents.—The number of documents received during the session was unusually heavy, there being 128 for the Senate and 284 for the House.

Nominations.—During the last session nominations exceeded those for the preceding session. In the first session of the Seventy-third Congress there were only 1,256, while in the second session the number was 4,664—of which 4,596, in 26 messages and averaging about 177 in each message, were for postmasters.

Hearings.—With a total of 281—of which 107 were for the Senate and 174 for the House—hearings also constituted another large congressional job of the “rush” type. The 14 House hearings on

the regular appropriation bills made 7,655 printed pages, and the 10 Senate appropriation hearings made 1,391 pages. The 20 parts already printed of hearings of the Senate Banking and Currency Committee on Stock Exchange Practices made 9,296 pages. In parts 19 and 20 there were 525 halftones. The 30 completed parts of the hearings on the Condition of Indians made 16,416 pages.

Executive Journals.—In the last session of the Seventy-second Congress the Senate authorized the printing of the Executive Journals from 1901 to and including the past session. The entire work will consist of 39 volumes, 12 of which will be in 2 parts, thus making 51 books. At the present time 14 volumes have been completed, and the text of all but 2 is in type. Index copy on 19 volumes is yet to come, the indexes in some cases being more extensive than the text.

The following is a tabular summary of congressional work for the past session :

Congressional Record :

Daily issues.....	139
Pages.....	13, 110
Average number of pages per day.....	94.32

Bills and resolutions :

Senate :

Bills.....	1, 851
Resolutions.....	176
Joint resolutions.....	80
Concurrent resolutions.....	19

Total..... 2, 126

House :

Bills.....	3, 838
Resolutions.....	258
Joint resolutions.....	168
Concurrent resolutions.....	24

Total..... 4, 288

Reports :

Senate.....	1, 311
House.....	1, 795

Total..... 3, 106

Documents :

Senate.....	128
House.....	284

Total..... 412

PATENT OFFICE PRINTING

The outstanding feature in patent and trade-mark printing was the complete change in dress inaugurated in August 1933. Ionic 7½-point type is now used instead of the old 10-point roman, so that little or no resetting is needed for the Official Gazette. It was thought for a time that this change would increase the size of the Gazette, but close make-up has held the number of pages to a minimum. For a 6-month period with the larger type 22,707 patents made 7,338 pages in the Gazette while in a like period with the Ionic 25,300 patents made 7,890 pages.

Patents, trade marks, and designs decreased slightly this year. Comparative figures show that during 1933, 63,021 patents, trade marks, and designs made 192,889 pages; while in 1934, 62,454 of the same three items made 165,682 pages. The average weekly issue for 1933 was 977 patents, and for 1934, 934 patents. During the year the Gazette required 60,778 illustrations, an average of 1,169 line cuts per week. The following figures show production for the year:

Patents-----	48,523	Office patents-----	30
Trade marks-----	10,139	Labels-----	1,635
Designs-----	2,419	Prints-----	495
Reissues-----	343		

CONGRESSIONAL LIBRARY PRINTING

The work done by this branch, which handles copyrights and other work for the Library of Congress, requires equipment for printing in more than 60 foreign languages and dialects.

Using a special quick-drying varnish, applied from a tint block, the Library printing branch, with the help of the Government Printing Office Division of Tests and Technical Control, has developed a suitable transparent facing for guide cards and case and table labels. The following table, summarizing all work produced by this branch during the year, shows a consistent increase in all operations:

	1934	1933	Increase
Chargeable impressions-----	29,324,356	27,802,197	1,522,159
Actual impressions-----	2,546,167	2,283,843	262,324
Chargeable forms sent to press-----	13,859	7,116	6,743
Actual forms sent to press-----	5,372	4,236	1,136
Subject heading lines sent to press-----	169,151	149,272	19,879
Subject headings printed-----	503,105	448,069	55,036
Jackets written-----	1,175	1,168	7
Jackets closed out-----	1,171	1,156	15

PRINTING FOR THE RECOVERY PROGRAM

There was a general change during the year in the class of printing demanded by the various departments and independent establishments. The 54 recovery activities, all created in the last 18 months, have demanded a tremendous amount of job printing. In former years, book and pamphlet work predominated, but this year the numerous blank forms necessary to carry on the administration's relief program greatly increased job composition, platemaking, and press and bindery work. A total of 77,000 jobs passed through the Printing Division of the Office this year, as compared with 55,000 last year, an increase of 40 percent. The average number of jobs in the Office was 6,057; the largest number on hand in one day being 8,205, on June 29, 1934; the lowest number, 5,507, on July 10, 1933. The average number of jobs during the previous fiscal year was 4,823, the daily average increase during the current year being 1,234.

In addition to the 20,921,715 copies of the 2,557 individual codes, which were mailed by the Superintendent of Documents, the National Recovery Administration, since its establishment June 14, 1933, required millions of forms and pamphlets. There are approximately 500 approved codes. The Office has practically finished printing the "Labor Provisions" posters that follow each code. These posters ran from 200 to 800,000 copies each, and constituted in themselves a large amount of work for the job composing, press, and bindery branches of the Office.

A million and a half two-color Blue Eagle code cards were handled. The President's Reemployment Agreement called for the printing, cutting, and folding of 6,000,000 circular letters and a like number of accompanying slips, of which 814,168 copies of each, together with an equal number of return envelopes (printed in the course of manufacture by outside concerns), were inserted in individual envelopes and mailed in varying quantities to every post office in the United States. At the same time 22,000,000 copies of consumer's cards were printed and cut, of which 19,156,000 copies were likewise mailed directly from the Government Printing Office to approximately 50,000 post offices. Both jobs were completed and mailed in 5 working days.

One of the newest ideas of the N.R.A. is a four-column tabloid weekly newspaper called "The Blue Eagle", running either 4 or 8 pages and having a circulation of about 50,000.

In response to the President's desire to hasten the return of normal conditions, the Office rushed to the limit all printing for the new agencies created by Congress. Many letters expressing appreciation of the Office's prompt and helpful service were received from these agencies, as well as from other departments of the Government.

Among the many large jobs completed for other Federal agencies were 7,000,000 forms and pamphlets printed and mailed for the Agricultural Adjustment Administration; 7,500,000 cards for the Labor Employment Service, and 550,000 postmaster-examination blanks and pamphlets for the Civil Service Commission. The Agricultural Adjustment Administration's activities covering cotton, wheat, corn, hogs, cattle, tobacco, etc., required the printing of multiple forms, using different colored stock for each of the forms and the various duplicates.

NATIONAL PARKS PAMPHLETS

One of the outstanding series of publications issued during the year was a group of pamphlets giving general information on the 19 national parks. These pamphlets, averaging about 48 pages each and varying in quantity from 10,000 to 40,000 copies, were produced on offset presses. The covers, in most instances, were hand-drawn by Office designers.

GOVERNMENT ORGANIZATION CHARTS

Another unique job, printed by the same process, was a series of approximately 300 charts showing in detail the organization and functions of the entire Government service, for use of the National Emergency Council. This was the first time a complete compilation of organization charts of the entire Government service was attempted.

PAPER AND OTHER PURCHASES

Specifications for paper and envelopes for the period of March 1, 1933, to February 28, 1934, were sent by the Purchasing Division to 425 firms, and 31 contracts were placed. Specifications were again issued in January for the period of April 1 to June 30, 1934, and these were sent to approximately 200 firms, which resulted in the placing of 32 contracts. Specifications were issued in April for the term of 6 months or 1 year beginning July 1, 1934. All bids for paper were rejected and six contracts entered into for envelopes. As practically all the printing of the relief agencies was of an emergency nature and required immediate delivery, bids for paper were obtained by telegraph or telephone. To meet these demands, approximately 44,000,000 pounds of paper were purchased. In addition, 22,250,000 tabulating cards and 26,500,000 continuous forms were required. All purchases of paper during the month of March 1934 were made in open market. Orders approximating \$3,435,000 were placed for materials, including paper, our biggest item, which alone amounted to about \$2,650,000. This is an increase of about \$1,300,000 over the previous fiscal year.

CHANGES IN PERSONNEL

Ninety-two men and twenty-eight women employees retired during the last fiscal year, 90 for age and 30 for disability. Of this total, 49 took advantage of section 1 of the present retirement act, which allows retirement at employee's option for those who would be eligible at the age of 70, 65, or 63 years, as the case may be, after attaining the age of 68, 63, or 60 years, respectively, providing they have rendered at least 30 years' service. The total retirements for age, disability, and optional from August 20, 1920, to June 30, 1934, were 1,437.

Changes in personnel that occurred during the past year necessitated many additional appointments, as follows:

On rolls June 30, 1933-----	4, 557
On rolls June 30, 1934-----	4, 793
Retired-----	120
Died-----	22
Separated from service-----	680
Appointed-----	916

More appointments were made during the past year than in any other fiscal year since 1920, with the exception of 1931, when 938 appointments were made. The 680 separations during 1934 exceeded those for any other period since 1925, when 734 employees left the service.

PLATEMAKING DIVISION

While stereotype plates were used when possible, some of the press runs were so large considerable electrotyping was required. The large financing operations of the Treasury Department caused the Bureau of Engraving and Printing to order from this Office many coupon plates for bonds. Some of these orders required as many as 6,000 plates. Because of the necessary speed in issuing bonds after the Treasury Department has advertised an issue, this Office had to deliver many of these orders overnight.

More than 2,000 square inches of illustration work were produced every day by the Photo-engraving Section of the Office, exclusive of work done for the Official Gazette, this publication alone using 60,778 cuts during the year. The Offset Section used 7,881 negatives produced by the Photo-engraving Section.

During the year 11,601 signatures of new book plates were received and stored in the plate vault, and over 596,818 pounds of metal supplied the Metal Section for remelting in making new plates. All told, there were 113,843 pages stereotyped and 45,709 electrotyped.

When the Civil Works Administration decided to pay the thousands of "out-of-work" employees by check, the Bureau of Engrav-

ing and Printing printed the checks; this Office, however, printed two carbon copies for each sheet, or about 80,000,000 checks, all of which had to be delivered on a specific date to insure prompt payment.

PRESS DIVISION

Owing to unusual demands, not only has the Press Division required the services of additional employees but the division has also found it necessary to run on a 24-hour basis. The following table shows the increase in presswork over the previous year:

	1934	1933	Increase
Actual impressions.....	915, 871, 672	656, 466, 879	259, 404, 793
Chargeable impressions.....	2, 808, 468, 475	1, 985, 697, 739	822, 770, 736
Forms put to press.....	165, 181	161, 192	3, 989
Jobs completed.....	55, 471	45, 861	9, 623

Money orders and postal cards.—Money orders and postal cards reached a high production mark. Money orders, considered by many a reliable criterion of the Nation's economic condition, showed an increase of 51,483,800, there being 220,817,000 printed, the largest annual production in the history of the Office. Production of postal cards increased 238,048,740, the total output being 1,528,518,300 for the year.

Thirty other large runs in the Press Division totaled 283,851,771 copies, and in addition there were produced 298,453,000 tabulating cards, an increase of 68,600,000 over the previous fiscal year. While the figures total 2,331,640,071 copies completed, they cover only 33 of the 55,471 jobs completed in the pressroom last year.

PRINTING DIVISION

In the Printing Division approximately 60,000 type forms were imposed and dropped during the past year, while there were 129,178 pages of type held for future reprints.

THE BINDERY DIVISION

Cutting and ruling machines have been running 16 hours a day since November 1, 1933. Pamphlet binding has been heavy on folding blanks of a great variety of very large orders. One job of approximately 13,500,000 copies was required in such haste that the Office had to install two large additional folders.

The Bindery Division was called upon to perform operations never before undertaken, and completed 65,631 jobs during the last

fiscal year, an increase over the previous year of 7,050. Owing to the increase in work, it was necessary to increase the bindery force by 75 bookbinders, 42 bindery operatives, 146 skilled laborers, and 5 graduate apprentices, a total of 268. The bindery force, not including those in Superintendent's office and Congressional Library branch, stood at the close of the year at 1,100 employees, as against 897 at the beginning of the fiscal year, an increase of 203.

DELIVERY SECTION

In addition to 226 carloads of postal cards, weighing 9,208,760 pounds, outgoing carload lots handled by the fleet of trucks consisted of blank paper, metal, and paper cores and weighed 415,555 pounds. Less-than-carload lots amounted to 563,779 pounds, making a total of 10,188,094 pounds of outgoing freight. This, added to the 62,377,468 pounds of incoming freight, totaled 72,565,562 pounds, or 36,282 tons, of freight handled to and from freight yards alone. There is no way to compute the tonnage of finished work hauled to the numerous Government establishments throughout the city, but practically the whole 36,000 tons of paper was again hauled as printed matter.

STORES DIVISION

The Stores Division worked overtime in handling the tremendous quantities of supplies needed by the emergency agencies. Although all months were unusually heavy, receipts in December 1933 of 185 cars broke all past records. Another all-time record was broken February 19, 1934, when 41 cars were on the tracks to be unloaded. Paper receipts for the year totaled 1,524 cars, or 60,682,485 pounds, while there were 23 cars of other supplies, weighing 718,273 pounds. Total supplies handled, including paper, were 1,547 cars, as compared with 909 cars received during the fiscal year ended June 30, 1933.

MAINTENANCE DIVISION

The work of the Maintenance Division includes maintaining buildings and equipment in an efficient operating condition; handling all problems of an engineering character; carrying through with its own force, or by contract, alterations and repairs; designing, constructing, and installing special equipment to meet unusual requirements in the Government Printing Office; preparing specifications for new machinery and equipment; operating all equipment for power conversion and distribution, emergency electric generating equipment, heating, lighting, ventilating, refrigerating, and laundry equipment; compressed-air service, signal systems, elevators, conveyor systems, and cleaning buildings. The personnel of the division averaged

during the year 353 employees. The shops reported a total of 162,135 maintenance jobs, exclusive of cleaning the buildings and operating power plant, elevators, and laundry work.

On July 2, 1933, work was begun on the construction of a storage extension containing 5,494 square feet of floor space. It was completed September 8, 1933. It is used principally for the storage of oils, gasoline, and bulky building materials, much of which was formerly stored in alleyways.

The Government Printing Office, with about 4,800 employees, and with property and equipment valued at more than \$10,000,000, is housed in a group of buildings having approximately 22 acres of floor space. Seventy percent of this area is contained in modern steel frame buildings, while 30 percent is located in old buildings, some of which date back 78 years, to 1856. These old buildings contain important production groups which print money orders and postal cards. They also house large stocks of paper for printing, approximately 20,000,000 copies of Government publications, as well as the mailing rooms, from which 40 to 50 tons of publications go out daily by mail. This tonnage does not include printing delivered to the Government departments in Washington.

Printing demands have increased year by year to the point where it has become necessary to crowd machinery, equipment, and materials to an extent that necessitates much wasteful rehandling, with consequent increased cost and delayed production. The plant is working at full day capacity and in addition two 8-hour night shifts are required, thus affording 24-hour production. These conditions make added building space necessary, not only to meet present needs but for ever-increasing needs, as indicated by the 73-year history of the Office.

Too strong emphasis cannot be placed on the serious danger to lives of employees from fire hazard, possible structural collapse of heavily loaded old wooden frame buildings, and from the use of antiquated elevators in these old buildings.

DIVISION OF ACCOUNTS

The increase in volume of printing and binding ordered of the Public Printer, accompanied by the greater number of employees and a personnel turn-over of approximately 20 percent, resulted in a decided increase in the work of the Division of Accounts. The pay cuts of 15 percent for the first 9 months and 10 percent for the last 3 months of the year with required refund in April of a portion of the 15 percent deduction, the large number of temporary uprates in pay by requirements of work in production divisions by which some employees would have 5 or 6 different rates in one 2-week pay period, and payments for leave at rate at which it was earned, all complicated and slowed up the pay-roll work.

The increased output of printing and binding was distinctly reflected in the increase in number of jobs computed, recorded, and billed, and the number of vouchers drawn to cover purchases.

This office renders a bill for each job delivered to the various governmental activities, and depends almost entirely on the prompt payment of such bills to meet its current pay-roll and purchase obligations. When customers do not pay promptly, it frequently is found difficult to accumulate in the Treasury sufficient collections in time to accomplish the routine of requisitioning the necessary funds for pay roll.

DIVISION OF PUBLIC DOCUMENTS

Records of the Superintendent of Documents for the year ended June 1934 show an increase, both in the amount of sales and in the number of orders. Receipts from sales amounted to \$594,007.64, an increase of \$53,475.35 over last year's receipts. The 496,215 sales orders exceeded those of the previous year by 14,920. The earnings by excess of sales to the public over cost of publications printed for sale amounted to \$302,842.23 for deposit in the Treasury to credit of miscellaneous receipts, exceeding last year's sum by \$80,711.36.

Congress has placed its stamp of approval on the sale of publications as a source of revenue, and every possible effort will be made to increase sales. Information on almost every subject is printed in Government publications, and the public is certainly entitled to know what has been issued. Not only is publicity needed but also better cooperation on the part of the issuing offices.

Distribution is inevitably complicated by the introduction of new distributing agencies, which serve only to confuse the librarians and the public. The establishment of a single distributing organization is needed. It would soon be recognized as the source from which definite information on all documents could be secured. The public is at present experiencing much inconvenience along this line.

The library of the Office of the Superintendent of Documents now totals 628,105 books, pamphlets, and maps, a gain of 35,906 during the past fiscal year. This library is of great value in research. It contains publications of the various Government departments, bureaus, committees, and commissions from the time of their establishment; also congressional proceedings beginning with the first session of the First Congress.

DIVISION OF TESTS AND TECHNICAL CONTROL

Operations increased 30.5 percent over the previous year, 8,625 samples being tested. As a result of these tests, which covered paper

and envelops, textiles, bookbinding leather, metals, glue, inks and ink-making materials, oils and greases, gasoline, chemicals, and many other items, 367 deliveries were rejected for noncompliance with specifications—310 of paper, 12 of envelops, and 45 of miscellaneous materials.

Few changes were made during the year in the specifications for paper. Of the 55,578,672 pounds received, an increase of 19,311,881 pounds over last year, 3,778,039 pounds were rejected.

There were 7,553,895 pounds of type metal standardized, a decrease of 969,343 pounds under last year. Production of printing ink for the past 12 months was 179,749 pounds, an increase of 25,251 pounds. There were 3,494 press rollers manufactured during the year, an increase of 509 rollers. There were 77,225 pounds of molded glue manufactured, an increase of 1,187 pounds.

In addition to the constant surveillance this division maintains over purchases for this Office, it has rendered valuable assistance to many other Government organizations. As in previous years, many miscellaneous supplies, manufactured by the Office, were furnished other Government agencies. The total charge for such materials this year was \$28,457 as compared with \$19,280 last year. The estimated savings to the departments for the year were \$25,000. The following table shows the quantities of the different supplies furnished to the various Government agencies for the fiscal year 1934:

	<i>Pounds</i>
Mimeograph ink, black-----	60,804
Printing inks, black and colored (including mimeograph) -	6,426
Addressograph ink, blue and black-----	299
Writing ink, blue, black, and red----- ¹	17,520
Stamp-pad and numbering-machine inks-----	3,022
Molded glue, including canceling-stamp composition-----	3,084
Paste-----	10,800

Many requests for technical and other information were made by commercial firms. The value of this service to industry was reflected during the year in numerous letters of appreciation. The complete report of the Technical Director is printed elsewhere in this report.

APPRENTICE SECTION

Since July 5, 1922, the Apprentice Section has graduated 325 apprentices from 488 original appointments. For various reasons 87 have resigned or been separated from the service, leaving 76 on the rolls at the close of the year.

In a school printing exhibit at the Thirteenth Annual Conference on Printing Education held in Detroit, Mich., the work of the Government Printing Office apprentices, in a group of three typo-

¹ Quarts.

graphical arrangements, was awarded second place. Apprentice William H. Weed was voted first prize. Mr. Weed was also awarded second place in the Printing Education Conference exhibit of last year. This is the eighth time the school has received prizes and awards or, in the absence of prizes and awards, honorable mention.

The educational course in this Office is planned for practical use in the printing trade as a whole. The subjects include English, history of printing, American literature, arithmetic, and spelling, the latter of which is considered of prime importance. The school has developed a number of excellent spellers, the year's average grade for all students being 89.67.

HEALTH, SAFETY, AND WELFARE ACTIVITIES

During the year the emergency hospital of the Government Printing Office gave 3,275 surgical treatments to employees injured while on duty, and 1,695 re-treatments for other surgical conditions, which permitted employees to remain at work and to perform efficient service, with little or no loss of time. There were also 8,301 medical treatments given, and 5,088 re-treatments, making a total of 18,359.

The splendid accident-prevention record attained by the Office during the past 10 years is attested by the following comment which appeared in the *Monthly Labor Review*, published March 1934, by the Department of Labor:

In spite of the manual work performed, the experience of the Government Printing Office shows proportionately fewer injuries, in each year from 1922 to 1932, than in any other branch of the service. Its frequency rates are also considerably less than the average frequency rates quoted by the National Safety Council for its members in the printing and publishing industry, presumably the best-regulated private establishments of similar character.

CAFETERIA

The cafeteria is owned and operated by the Office employees, and requires the services of about 60 non-civil-service workers, whose wages are paid from receipts. Approximately 2,500 meals at an average price of 18½ cents are served daily. The Cafeteria Association sponsored numerous recreational activities during the year, and many social, patriotic, and official events were held in Harding Hall, the Office auditorium. The outstanding improvement was the installation of a roof-sprinkling system to lower the room's temperature during summer months.

GROUP INSURANCE

The Government Printing Office Group Life Insurance Association, since its organization May 1, 1931, to June 30, 1934, has paid

out \$61,500 on 76 claims. At the close of the fiscal year, 2,852 first-unit policies, totaling \$2,393,250, and 1,363 second-unit policies, totaling \$1,142,500, had been issued, and \$137,330.24 was received and deposited. The reserve fund totaled \$21,914.86, of which \$19,000 was in United States Treasury bonds and \$2,914.86 in checking accounts.

The association is carrying on its work as a welfare organization, providing insurance at the cost of \$1 per month per unit in amounts from \$250 to \$1,000, according to employee's age.

RECOMMENDATIONS

Because of limited time, a close study of the personnel and a detailed inspection of the plant and its mechanical equipment have been impossible, and but few recommendations can be offered.

The entire plant is badly overcrowded, and an additional large modern building is needed to replace antiquated and dangerously weak buildings dating back 78 years. The passageways are frequently jammed with work, which necessarily slows up production and actually produces a dangerous condition. The old building, which has been condemned several times as a fire trap and a hazard to the rest of the Office, is of little use even for storage purposes. Roof and window repairs, needed continually to protect stored printed matter, make it a constant expense. Preceding Public Printers have for years urged the erection of a new building in its place, for there is great need of safe, spacious storage facilities.

The Government Printing Office is a production plant and must be considered as such. Mere renting of storage and office space will not overcome its difficulties. No plant, either governmental or private, can operate efficiently in overcrowded and obsolete quarters. These conditions have reached a state of emergency where the Government should not further delay the demolition of dangerous buildings. They should be replaced with a modern building to safeguard the lives of employees and to provide the space needed to meet present urgent needs and future normal growth.

Acoustic treatment to reduce noise in the main building is contemplated, particularly in the machine composing rooms and in the proofroom, where less noise disturbance would no doubt reduce errors, increase production, and prove beneficial to the health of employees.

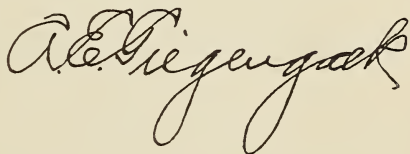
As inadequate ventilation exists throughout all buildings, air-conditioning facilities should be installed in all rooms occupied by workers.

Many of the methods of the Office and much of its equipment being wholly out-of-date, in some cases obsolete, plans looking toward complete modernization are under way.

LOOKING AHEAD

The establishment of the 40-hour week by Congress will probably necessitate many adjustments in the routine of the Office, since the other Federal establishments, not coming within the 40-hour-week provision of the law require service on a 6-day schedule. It is also likely that additional appointments will be necessary, for, despite the fact that work last year exceeded all past records, current indications promise that the volume of business for the coming year will be even larger. Added to the printing needed by the present emergency organizations, which are barely reaching their stride, will be the demands of still other agencies likely to be created by the next Congress. With recovery definitely on the upswing and the Nation assuming more normal aspects, it is inevitable that printing will climb to new records. These conclusions are based upon the opinion, quite generally held, that once the depression is definitely left behind there will dawn a new and undreamed-of era of productivity and prosperity.

Under authority of the act approved February 28, 1933 (Public, No. 381, 72d Cong.), the practice of printing supplementary records and statistics in the Annual Report of the Public Printer has been discontinued, and original copies of such information as has been prepared for transmission to Congress are on file for public inspection.

A handwritten signature in cursive script, reading "A. E. Tiegengack". The signature is fluid and elegant, with the first letters of each word being capitalized and prominent.*Public Printer.*

DIVISION OF ACCOUNTS
STATISTICAL TABLES

STATISTICAL TABLES

COMPILED BY THE SUPERINTENDENT OF ACCOUNTS AND BUDGET OFFICER

TABLE 1.—*Resources and liabilities under appropriations for the fiscal year ended June 30, 1934*

RESOURCES

Appropriation for working capital, Public Act 381, 72d Cong., approved Feb. 28, 1933 (\$1,750,000, less \$450,000 made available for 1933 by same act).....	\$1,300,000.00	
Public Act No. 268, 73d Cong., approved May 30, 1934, from 1933 unexpended balance.....	500,000.00	
Public Act No. 141, 73d Cong., approved Mar. 28, 1934.....	90,635.00	
Payments from all sources for printing and binding.....	9,783,518.79	
Refunds from various sources.....	108.93	
Bills receivable July 1, 1934, for printing and binding furnished.....	275,598.22	
		\$11,949,860.94
Appropriations for salaries, Office of Superintendent of Documents, Public Act 381, 72d Cong.....		502,000.00
Appropriation for general expenses, Office of Superintendent of Documents, Public Act 381, 72d Cong.....		210,800.00
Balance of appropriation for equipment for Government Printing Office Building ¹		1,205.03
Chicago World's Fair Centennial Celebration, 1933-34.....		4,149.82
Total resources available for fiscal year 1934.....		\$12,668,015.79

LIABILITIES

Working capital and repayments for printing and binding:		
Disbursed to June 30, 1934.....	\$10,200,316.11	
Impounded and credited to surplus fund.....	209,496.83	
Outstanding obligations July 1, 1934.....	1,502,835.76	
Total disbursed and outstanding obligations.....		\$11,912,648.70
Salaries, Office of Superintendent of Documents:		
Disbursed to June 30, 1934.....	\$435,808.52	
Impounded and credited to surplus fund.....	24,188.37	
Outstanding obligations July 1, 1934.....	18,227.72	
Total disbursed and outstanding obligations.....		478,224.61
General expense, Office of Superintendent of Documents:		
Disbursed to June 30, 1934.....	\$132,051.89	
Outstanding obligations July 1, 1934.....	78,598.11	
Total disbursed and outstanding obligations.....		210,650.00
Chicago World's Fair Centennial Celebration 1933-34:		
Disbursed to June 30, 1934.....	\$3,149.82	
Outstanding obligations July 1, 1934.....	152.90	
Total disbursed and outstanding obligations.....		3,302.72
Total disbursed to June 30, 1934.....	\$10,771,326.34	
Total impounded and credited to surplus fund.....	233,685.20	
Total outstanding obligations July 1, 1934.....	1,599,814.49	
Total disbursed, impounded, and outstanding obligations.....		12,604,826.03
Unobligated balance (subject to 10% over or under on outstanding orders) ^{2 3}		63,189.76
Total.....		12,668,015.79

¹ Appropriated in 1929, available until used.

² Includes \$1,205.03, equipment for Government Printing Office Building, available 1935.

³ Includes \$847.10, Chicago World's Fair Centennial Celebration, available 1935.

TABLE 2.—Summary of financial transactions in fiscal year ended June 30, 1934, covering appropriations for fiscal years 1932, 1933, 1934

APPROPRIATION FOR 1932

	Resources	Disbursements	Unexpended balance July 1, 1934
Public printing and binding:			
Unexpended balance, July 1, 1933.....	\$13,374.04		
Credits to appropriations by payments from all sources for printing and binding and other receipts from miscellaneous sources.....	10.00		
Disbursed for labor.....		\$189.24	
Disbursed for material and supplies.....		8,675.86	
Total.....	13,384.04	8,865.10	\$4,518.94
Salaries, Office of Superintendent of Documents:			
Unexpended balance, July 1, 1933.....	11,719.60		11,719.60
General expense, Office of Superintendent of Documents:			
Unexpended balance, July 1, 1933.....	561.68		
Disbursed.....			
Total.....	561.68		561.68
Grand total appropriation.....	25,665.32	8,865.10	16,800.22
Unobligated balance of 1932 appropriation on June 30, 1934.....			16,800.22

APPROPRIATION FOR 1933

Public printing and binding:			
Unexpended balance, July 1, 1933.....	\$2,070,305.00		
Credits to appropriations by payments from all sources for printing and binding and other receipts from miscellaneous sources.....	190,146.36		
Public Act No. 381, 72d Cong., approved Feb. 28, 1933.....	450,000.00		
Disbursed for labor.....		\$334,175.02	
Disbursed for paper.....		564,346.73	
Disbursed for lithographing and engraving.....		37,647.06	
Disbursed for material and supplies.....		88,291.42	
By transfer, Legislative Act 1935, Public Act No. 268, 73d Cong.....		500,000.00	
Reserved for impound.....		1311,473.66	
Total.....	2,710,451.36	1,835,933.89	\$874,517.47
Salaries, Office of Superintendent of Documents:			
Unexpended balance, July 1, 1933.....	56,179.42		
Disbursed.....		18,986.80	
Impounded and credited to surplus fund.....		17,145.00	
Total.....	56,179.42	36,131.80	20,047.62
General expense, Office of Superintendent of Documents:			
Unexpended balance, July 1, 1933.....	37,936.33		
Disbursed.....		18,602.59	
Total.....	37,936.33	18,602.59	19,333.74
Grand total appropriation.....	2,804,567.11	1,890,668.28	913,898.83
Deduct for outstanding obligations.....			34,015.72
Unobligated balance of 1933 appropriation on June 30, 1934.....			879,883.11

APPROPRIATION FOR 1934

Public printing and binding:			
Appropriation for working capital, Public Act 381, 72d Cong., approved Feb. 28, 1933 (\$1,750,000 less \$450,000 made available for 1933 by same act).....	\$1,300,000.00		
Public Act No. 268, 73d Cong., approved May 30, 1934, from 1933 unexpended balance.....	500,000.00		
Public Act No. 141, 73d Cong., approved Mar. 28, 1934.....	90,635.00		
Credits to appropriation by payments and bills receivable from all sources for printing and binding and other receipts from miscellaneous sources.....	10,059,225.94		

¹ Credit given by Treasury in 1934.

TABLE 2.—Summary of financial transactions in fiscal year ended June 30, 1934, covering appropriations for fiscal years 1932, 1933, 1934—Continued

APPROPRIATION FOR 1934—Continued

	Resources	Disbursements	Unexpended balance July 1, 1934
Public printing and binding—Continued			
Disbursed for labor.....		\$7,861,957.78	
Disbursed for paper.....		1,792,163.68	
Disbursed for lithographing and engraving.....		43,640.39	
Disbursed for material and supplies.....		502,554.26	
Impounded and credited to surplus fund.....		209,496.83	
Total.....	\$11,949,860.94	10,409,812.94	\$1,540,048.00
Salaries, Office of Superintendent of Documents:			
Legislative Act of Feb. 28, 1933.....	502,000.00		
Disbursed.....		435,808.52	
Impounded and credited to surplus fund.....		24,188.37	
Total.....	502,000.00	459,996.89	42,003.11
General expense, Office of Superintendent of Documents:			
Legislative Act of Feb. 28, 1933.....	210,800.00		
Disbursed.....		132,051.89	
Total.....	210,800.00	132,051.89	78,748.11
Equipment, Government Printing Office Building:			
Legislative Act of Feb. 28, 1929.....	¹ 1,205.03		
Disbursed to June 30, 1933.....			
Total.....	1,205.03		1,205.03
Chicago World's Fair Centennial Celebration:			
Public Act No. 14, 72d Cong., approved Feb. 8, 1932, available in 1934.....	4,149.82		
Disbursed.....		3,149.82	
Total.....	4,149.82	3,149.82	1,000.00
Grand total appropriation.....	12,668,015.79	11,005,011.54	1,663,004.25
Deduct for outstanding obligations.....			1,599,814.49
Unobligated balances of 1934, appropriations on June 30, 1934.....			² 63,189.76
Total unobligated balances (subject to change by 10 per- cent over and under on outstanding obligations):			
1932.....			16,800.22
1933.....			879,883.11
1934.....			63,189.76
Total.....			959,873.09

RECAPITULATION—ALL APPROPRIATIONS

Total paid for labor.....	³ \$8,196,322.04
Total paid for material and supplies.....	599,521.54
Total paid for lithographing and engraving.....	81,287.45
Total paid for paper.....	2,356,510.41
Total impounded and credited to surplus fund (including amount for 1933, credited by Treasury in 1934).....	520,970.49
By transfer, Public Act No. 268.....	500,000.00
Total paid for printing and binding.....	12,254,611.93
Total paid for salaries, Office of Superintendent of Documents.....	⁴ 454,795.32
Total paid for general expense, Office of Superintendent of Documents.....	150,654.48
Total paid for Chicago World's Fair Centennial Celebration.....	3,149.82
Total credited to surplus fund.....	41,333.37
Grand total.....	⁵ 12,904,544.92

¹ Appropriated Feb. 28, 1929, and available until used.² Includes \$1,205.03, equipment, Government Printing Office Building, available in 1935.³ Includes \$286,341.71, deposited to credit of retirement fund.⁴ Includes \$16,962.98, deposited to credit of retirement fund.⁵ Includes \$303,304.69, deposited to credit of retirement fund.

TABLE 3.—*Moneys received during fiscal year 1934, the source, and Treasury deposit*

1918	
Deposited to the credit of appropriation for public printing and binding:	
Refund.....	\$1.20
1931	
Deposited to the credit of appropriation for public printing and binding:	
For miscellaneous printing and binding.....	31.92
1932	
Deposited to the credit of appropriation for public printing and binding:	
Refund.....	10.00
1933	
Deposited to the credit of appropriation for public printing and binding:	
For printing and binding for departments and bureaus.....	\$186,002.07
For miscellaneous printing and binding.....	2,923.37
Refunds.....	16.00
Total.....	188,941.44
1934	
Deposited to the credit of appropriation for public printing and binding:	
For printing and binding for departments and bureaus.....	\$9,031,085.82
For miscellaneous printing and binding.....	46,384.66
Refunds.....	108.93
Auditor disallowance.....	8.11
Total.....	9,077,587.52
Deposited to the credit of appropriation salaries, Superintendent of Documents:	
Auditor disallowance.....	3.26
Grand total.....	9,266,575.34

TABLE 4.—*Production of principal items entering into printing and binding in fiscal years 1932, 1933, 1934*

Item	1932	1933	1934
Main office and Congressional Library branch:			
Total charges for printing and binding.....	¹ \$14,333,380.35	² \$12,941,095.24	¹ \$12,949,752.01
Jackets written.....number.....	62,455	55,268	71,529
Estimates made.....do.....	56,417	48,466	60,572
Bills computed.....do.....	79,741	74,105	89,671
Time work in composing section.....hours.....	268,912	249,913	256,824
Electrotypes, stereotypes, and matrices			
square inches.....	11,166,868	9,942,300	11,849,454
Postal cards printed.....number.....	1,366,070,600	1,290,469,560	1,528,518,300
Money-order books shipped.....do.....	928,994	846,666	1,103,085
Forms sent to press.....do.....	181,800	165,428	170,553
Actual impressions.....do.....	610,621,912	658,750,722	918,417,848
Chargeable impressions.....do.....	2,216,059,261	2,013,499,936	2,837,792,831
Sheets folded.....do.....	410,557,697	336,092,301	459,568,519
Signatures gathered.....do.....	164,963,823	130,325,878	139,386,074
Tips made.....do.....	20,714,194	13,929,809	38,239,244
Copies wire stitched.....do.....	50,546,899	39,505,927	59,930,149
Copies paper covered.....do.....	13,108,675	8,860,923	10,252,705
Books and pamphlets trimmed.....do.....	66,867,873	40,499,587	68,384,582
Books rounded and backed.....do.....	1,178,720	1,164,972	725,636
Books marbled and edged.....do.....	243,084	183,037	213,179
Stamping impressions.....do.....	2,456,972	2,645,351	1,858,644
Books cased in.....do.....	1,248,225	1,240,900	788,562
Indexes cut.....do.....	168,970	109,135	127,910
Sheets passed through ruling machines.....do.....	39,288,618	26,235,643	52,112,662
Signatures sewed.....do.....	52,652,684	43,394,325	25,840,281
Copies punched and drilled.....do.....	177,944,855	133,255,943	163,091,831
Sheets and lines perforated.....do.....	8,611,419	6,335,548	7,975,470
Tablets made.....do.....	3,772,427	3,182,726	5,019,644
Miscellaneous rebinding, etc.....do.....	99,704	99,287	101,620

¹ Does not include estimated \$800,000 labor and material on uncompleted jobs.² Does not include estimated \$400,000 labor and material on uncompleted jobs.

TABLE 5.—Charges for work and to whom delivered during the fiscal year ended June 30, 1934

Congress:		
Congressional Record.....	\$698,645.88	
Publications for folding rooms.....	351,327.02	
Publications for international exchange.....	11,628.62	
Franked envelopes and document franks.....	38,831.28	
Bills, resolutions, and amendments.....	353,932.10	
Committee reports.....	88,781.43	
Documents.....	404,335.98	
Hearings.....	508,581.19	
Miscellaneous publications.....	76,259.50	
Miscellaneous printing and binding.....	363,312.00	
Total congressional printing and binding.....		\$2,890,635.00
Private orders by Members of Congress:		
Documents, reports, bills, etc.....		4,761.96
Speeches.....		38,867.17
Other private orders.....		4,010.31
Superintendent of Documents.....		451,804.41
Library of Congress.....		383,077.12
Agriculture.....		715,855.72
Commerce.....		571,831.48
Interior.....		335,970.52
Justice.....		166,187.18
Labor.....		282,411.30
Navy.....		482,276.35
Post Office.....		1,340,097.22
State.....		127,037.18
Treasury.....		901,529.22
War.....		508,480.76
Agricultural Adjustment Administration.....		504,919.38
Alien Property Custodian.....		801.03
Board of Mediation.....		1,445.31
Board of Tax Appeals.....		28,240.05
Bureau of the Budget.....		27,540.10
Chicago World's Fair Centennial Commission.....		521.12
Civil Service Commission.....		47,143.48
Commission of Fine Arts.....		299.89
Commodity Credit Corporation.....		28,937.01
Court of Claims.....		21,699.43
Court of Customs and Patent Appeals.....		3,271.81
District government.....		106,079.86
Emergency Conservation Work.....		19,932.45
Employees' Compensation Commission.....		23,490.11
Export-Import Bank.....		166.21
Farm Credit Administration.....		206,632.10
Federal Alcohol Control Administration.....		5,139.96
Federal Civil Works Administration.....		272,470.92
Federal Coordinator of Transportation.....		18,462.80
Federal Deposit Insurance Corporation.....		26,548.75
Federal Emergency Administration of Public Works.....		46,013.32
Federal Emergency Relief Administration.....		73,864.87
Federal Home Loan Bank Board.....		6,847.65
Federal Power Commission.....		2,852.11
Federal Radio Commission.....		13,222.04
Federal Reserve Board.....		42,721.89
Federal Surplus Relief Corporation.....		15,707.92
Federal Trade Commission.....		42,723.49
General Accounting Office.....		55,947.45
Geographic Board.....		3,476.77
George Washington Bicentennial Commission.....		14,395.21
Home Owners' Loan Corporation.....		110,373.94
Inland Waterways Corporation.....		816.53
Interstate Commerce Commission.....		130,370.35
National Advisory Committee for Aeronautics.....		12,092.79
National Emergency Council.....		25,761.96
National Forest Reservation Commission.....		420.71
National Recovery Administration.....		472,329.46
Pan American Sanitary Bureau.....		12,969.30
Pan American Union.....		25,459.82
Panama Canal.....		11,777.24
Patent Office.....		928,477.70
Railroad Administration.....		203.99
Reconstruction Finance Corporation.....		113,236.30
Shipping Board.....		10,346.73
Smithsonian Institution.....		36,514.25
Special Adviser to the President on Foreign Trade.....		840.20
Supreme Court:		
District of Columbia.....		5,841.91
United States.....		2,310.51
Tariff Commission.....		32,889.97
Tennessee Valley Authority.....		27,329.50
Veterans' Administration.....		114,321.67
White House.....		8,036.54
Yorktown Sesquicentennial Commission.....		350.00
Sundry accounts (9).....		333.25
Grand total.....		12,949,752.01

TABLE 6.—Cost of production for the fiscal year 1934

Division, office, or section	Salaries, wages, leave, and holiday pay	Material and supplies for operation	Maintenance and upkeep	Work by other sections, including proof and apprenticeship	Expense of delivery of product and storage of plates	Administrative and clerical expense	Paper and other stock issued, illustrations ordered, outside purchases vouchered	Reconciliation between issues and orders and same items computed	Total	Credits by work for other sections	Total cost of production
Job.....	\$381,701.72	\$4,181.96	\$39,622.96	\$65,050.24	\$7,952.32	\$32,170.25	---	---	\$530,679.45	\$122,689.39	\$407,990.06
Patents.....	337,561.29	481.01	73,867.06	391,525.01	3,921.00	27,081.43	---	---	834,386.80	2,398.00	831,988.80
Linotype.....	577,636.88	2,859.11	128,571.51	605,523.91	11,178.51	45,627.45	---	---	1,371,397.37	141,051.15	1,230,346.22
Monotype.....	920,377.28	3,939.51	198,010.13	1,145,860.66	17,903.47	73,365.76	---	---	2,359,456.81	303,824.43	2,055,632.38
Hand.....	366,657.33	2,003.43	39,364.84	52,995.08	7,122.93	29,092.81	---	---	497,236.42	384,218.61	113,017.81
Proof.....	1,047,015.09	619.25	99,574.09	72,329.54	12,430.66	85,727.73	---	---	1,317,696.36	1,317,696.36	---
Apprentice.....	142,784.01	199.41	13,583.71	2,709.45	2,006.18	10,693.68	---	---	1,171,976.44	150,439.86	21,536.58
Platemaking—molding, stereotyping, and finishing.....	212,372.57	8,193.99	32,141.67	32,020.13	4,359.15	25,939.55	---	---	315,027.06	80,032.66	234,994.40
Photo-engraving.....	66,361.98	6,474.50	7,419.03	6,351.60	1,357.82	8,024.51	---	---	95,989.44	11,742.19	84,247.25
Press.....	1,263,961.89	64,148.55	184,024.31	173,908.99	26,172.99	113,526.32	---	---	1,825,743.05	291,609.22	1,534,133.83
Pamphlet.....	763,624.86	5,248.60	97,711.18	305,504.40	9,170.54	66,117.47	---	---	1,257,499.23	11,422.76	1,246,076.47
Blank.....	642,959.43	10,654.07	72,894.34	16,516.23	7,721.10	55,496.13	---	---	1,438,758.27	22,544.68	1,416,213.59
Book.....	475,722.85	13,660.99	59,751.09	22,735.63	5,531.64	40,104.50	---	---	1,696,575.19	19,894.93	676,680.26
Money Order.....	45,776.37	1,178.52	7,959.39	729.38	574.73	4,195.71	---	---	102,106.27	107.98	101,998.29
Postal Card.....	96,829.48	2,686.21	17,718.05	796.09	1,487.24	10,832.79	---	---	401,035.98	813.06	400,222.92
Library printing branch.....	77,247.93	273.73	3,498.96	15,467.17	1,542.36	4,614.56	---	---	121,930.71	194.50	121,736.21
Library binding branch.....	137,223.54	323.28	4,044.78	900.41	1,603.78	3,577.05	---	---	159,136.66	8,809.01	150,327.65
Details chargeable.....	53,141.23	99.07	6,484.66	41.42	111.43	3,062.11	---	---	57,694.53	30,765.11	26,929.42
Metal.....	10,093.01	13,375.06	6,484.66	---	---	700.95	---	---	30,765.11	7,920.05	183,334.63
Stores.....	146,508.09	1,408.49	30,151.28	61.82	1,804.21	11,320.79	---	---	191,254.68	39,517.28	151,737.40
Ink.....	10,560.87	24,896.32	2,694.20	---	187.81	1,178.08	---	---	13,201.37	13,201.37	---
Roller and glue.....	4,114.81	7,014.09	1,701.30	---	60.89	320.28	---	---	1,742,786.84	---	1,742,786.84
Paper stock, Presswork Division.....	---	---	---	---	---	---	---	---	54,958.02	---	54,958.02
Illustrations.....	---	---	---	---	---	---	---	---	96,941.35	---	96,941.35
Outside purchases.....	---	---	---	---	---	---	---	---	---	---	---
Work for stock returned to stores.....	---	---	---	---	---	---	---	---	---	---	---
Light and power for city post office.....	---	---	---	---	---	---	---	---	---	---	---
Miscellaneous service for Superintendent of Documents other than printing and binding.....	---	---	---	---	---	---	---	---	---	---	---
Total.....	7,780,242.51	205,274.79	1,149,505.11	2,962,162.47	126,788.11	658,719.91	3,005,788.54	-122,134.33	15,766,317.11	2,960,892.60	12,805,424.51
Total.....	---	12,349.64	17,012.11	144.95	1,940.52	---	---	---	31,456.22	---	31,456.22

1 Total expense of all apprentices.

TABLE 7.—Itemized statement of the classes and charge for work delivered during the fiscal year ended June 30, 1934

Class of work	Number of copies	Number of type pages	Number of publica- tions bound	Charges for composition, presswork, plating, fold- ing, binding, illustrations, contract, miscellaneous	Charges for paper	Charges for authors' alterations	Charges for rush and overtime work	Total charges
Publications:								
Smaller than octavo.....	14,580,706	17,699	19,806	\$92,313.26	\$13,659.82	\$4,352.21	\$4,475.22	\$114,800.51
Octavo.....	84,813,467	727,372	493,384	2,908,021.26	291,133.18	82,983.66	207,234.96	3,549,373.06
Royal octavo.....	1,986,251	52,827	25,488	200,927.57	29,610.40	10,995.58	9,086.67	250,590.22
Quarto.....	3,861,816	136,453	36,497	458,716.54	31,784.50	19,107.27	10,901.17	520,590.48
Miscellaneous.....	21,622,102	858,994	98,779	304,599.57	83,845.23	3,714.88	72,709.00	380,820.04
Congressional Record.....	4,807,274	26,643	61,705	567,380.26	54,841.74	188.06	55,143.54	698,645.88
Bills, resolutions, and amendments.....	6,235,340	118,978	364	286,776.50	11,824.00	10,722.95	---	353,932.10
Specifications of patents, trade marks, etc.....	6,321,086	153,695	---	755,912.02	9,938.65	129.00	---	776,573.62
Official Gazette and Annual Indexes, Patent Office.....	246,778	17,331	30	136,118.50	14,076.21	---	---	150,323.71
Post-office money orders.....	220,410,450	---	---	105,839.93	44,570.62	---	---	150,410.55
Letterheads and envelopes.....	178,094,584	---	---	148,310.98	136,565.55	134.64	8,762.89	293,774.06
Blanks, notices, cards, schedules, etc.....	3,749,085,209	---	---	2,032,387.23	1,481,519.25	34,925.34	267,666.56	3,816,498.38
Blank books.....	4,509,869	---	---	303,716.59	70,109.39	897.98	16,413.04	391,137.00
Binding newspapers, documents, reports, etc.....	88,379	---	---	156,963.96	---	---	363.76	157,327.72
Blank paper.....	---	---	---	87,749.13	---	---	---	545,355.31
Contract printing.....	---	---	---	87,214.10	---	---	---	87,214.10
Printing and binding supplies.....	---	---	---	49,750.91	---	---	---	54,158.55
Miscellaneous charges.....	---	---	---	563,076.51	---	---	---	650,307.72
Total.....	4,295,469,911	2,103,992	731,053	9,305,774.82	2,805,045.00	171,359.41	667,572.78	12,949,752.01

TABLE 8.—*Inventory of quantity and cost of paper and envelopes, material and supplies, and machinery and equipment on hand June 30, 1934*

[Compiled by the Purchasing Division]

	Pounds	Cost
Paper:		
Printing.....	1,921,345	\$140,026.00
Mimeograph.....	288,225	22,015.00
United States money-order writing.....	34,507	2,607.00
Safety writing.....	33,791	3,606.00
Writing.....	1,060,301	52,783.00
Map.....	54,353	8,153.00
Manifold.....	281,566	43,157.00
Bond.....	1,461,502	195,117.00
Ledger.....	710,700	108,181.15
Index.....	188,900	26,078.67
Cover.....	142,200	18,275.54
Manila.....	177,200	8,972.50
Kraft.....	287,500	12,282.33
Manila tag board.....	888,200	58,735.72
Cardboard.....	37,300	3,524.10
Bristol board.....	752,000	21,654.50
Miscellaneous.....	63,700	10,680.00
Binders board.....	404,600	12,384.61
Total.....		748,233.12
Envelops.....		22,553.64
Total paper and envelopes.....		770,786.76
Other material and supplies:		
Miscellaneous supplies.....		141,134.56
Book cloth.....		13,822.35
Buckram.....		9,470.50
Leather.....		6,128.10
Ink ingredients.....		6,097.39
Gold leaf.....		4,487.04
Ink (made in Government Printing Office).....		4,113.18
Imitation leather.....		1,927.07
Cartons and containers.....		1,241.80
Total, material and supplies.....		188,421.99
Total, material and supplies, paper and envelopes.....		959,208.75
Machinery and equipment.....		5,415,250.82
Grand total.....		6,374,459.57

TABLE 9.—*Publications, including annual reports and documents, printed on requisition during the fiscal year ended June 30, 1934, for Congress and Government departments and independent establishments*

	<i>Copies</i>
Congress (does not include Congressional Record, bills, or private orders).....	5, 235, 279
Superintendent of Documents.....	10, 045, 947
Library of Congress.....	104, 899
Agriculture.....	14, 092, 328
Commerce.....	2, 206, 763
Interior.....	1, 403, 736
Justice.....	270, 570
Labor.....	2, 233, 513
Navy.....	4, 024, 946
Post Office.....	1, 520, 756
State.....	308, 819
Treasury.....	3, 242, 135
War.....	7, 102, 770
Agricultural Adjustment Administration.....	19, 638, 932
Alien Property Custodian.....	1, 564
American Battle Monuments Commission.....	7
Board of Mediation.....	12, 528
Board of Tax Appeals.....	116, 814
Bureau of the Budget.....	814
Central Statistical Board.....	1, 502
Civil Service Commission.....	372, 645
Commission of Fine Arts.....	1, 038
Commodity Credit Corporation.....	12
Court of Claims.....	37, 612
Court of Customs and Patent Appeals.....	791
District government.....	291, 569
Emergency Conservation Work.....	195, 158
Employees' Compensation Commission.....	10, 303
Executive Council.....	3
Farm Credit Administration.....	10, 702, 206
Federal Alcohol Control Administration.....	20, 175
Federal Civil Works Administration.....	215, 150
Federal Coordinator of Transportation.....	219, 360
Federal Deposit Insurance Corporation.....	2, 971, 529
Federal Emergency Administration of Public Works.....	551, 955
Federal Emergency Relief Administration.....	237, 809
Federal Home Loan Bank Board.....	97, 018
Federal Power Commission.....	2, 115
Federal Radio Commission.....	104, 746
Federal Reserve Board.....	444, 240
Federal Trade Commission.....	139, 140
General Accounting Office.....	13, 541
Geographic Board.....	33, 500
George Washington Bicentennial Commission.....	9, 000
Home Owners' Loan Corporation.....	923, 262
Inland Waterways Corporation.....	6, 002
Interstate Commerce Commission.....	1, 439, 562
National Advisory Committee for Aeronautics.....	35, 805
National Emergency Council.....	106, 000
National Forest Reservation Commission.....	6, 000
National Recovery Administration.....	22, 092, 864
Pan American Sanitary Bureau.....	67, 225
Pan American Union.....	134, 400
Panama Canal.....	2, 182
Puerto Rican Hurricane Relief Commission.....	2
Railroad Administration.....	653
Reconstruction Finance Corporation.....	191, 068
Shipping Board.....	19, 931
Smithsonian Institution.....	51, 833
Special Adviser to the President on Foreign Trade.....	50
Supreme Court:	
District of Columbia.....	20, 530
United States.....	6, 080
Tariff Commission.....	25, 255
Tennessee Valley Authority.....	80, 531
Veterans' Administration.....	92, 550
War Finance Corporation.....	100
White House.....	9
Yorktown Sesquicentennial Commission.....	5, 000
Total.....	113, 542, 131

TABLE 10.—*Receipts from miscellaneous sales during the fiscal year ended June 30, 1934*

Salvage.....	\$11, 375. 23
Waste paper.....	32, 689. 43
Telephone.....	11. 90
Surplus from sale of documents.....	350, 643. 75
Total.....	394, 720. 31

DIVISION OF TESTS AND TECHNICAL CONTROL
REPORT OF THE TECHNICAL DIRECTOR

REPORT OF THE TECHNICAL DIRECTOR

To the PUBLIC PRINTER:

The following report covers the work of the Division of Tests and Technical Control for the fiscal year ended June 30, 1934:

SAMPLES TESTED

The total number of samples tested during the year was 8,625, an increase of 30.5 percent over the number tested during the previous year, as follows:

	1934	1933		1934	1933
Paper and envelops.....	5,460	3,837	Oils and greases.....	69	42
Textiles.....	770	600	Gasoline.....	101	82
Bookbinding leather.....	62	41	Chemicals.....	124	352
Metals.....	645	808	Miscellaneous.....	909	368
Glue.....	47	61			
Ink-making materials.....	326	288	Total.....	8,625	6,611
Inks.....	112	132			

Of the 367 deliveries rejected for noncompliance with specifications, 310 were paper, 12 envelops, and 45 miscellaneous materials.

PAPER

Very few changes in the specifications for paper were made during the year, and some of these changes consisted only in more clearly defining the phraseology heretofore used. It was found advisable to increase the maximum limitation of ash content of rag white bond paper used in printing file patents. Owing to the low opacity of a regular bond sheet it is, when printed on both sides, not sufficient to prevent show-through. The specifications for binder's board were slightly modified to bring them into closer agreement with good commercial practice.

There were 55,578,672 pounds of paper received during the year, an increase of 19,311,881 pounds, or 53.25 percent, over last year. Of this amount 3,778,039 pounds, or 6.8 percent, were rejected.

The change making the fiscal year for paper purchases begin on July 1 instead of March 1 had a bearing on the number of rejections made this year. During the month of March paper was purchased in the open market, with the result that some contracts were placed with manufacturers who had not previously made paper for the Government and who consequently experienced some difficulty in meeting the acidity requirements. The 3 months intervening occasioned similar difficulties with respect to this and other requirements.

The following is a tabulation of paper rejections made during the fiscal year, with reasons for rejection. Some rejections included more than one deficiency.

Deficient in—	Number
Stock-----	3
Bursting strength-----	25
Folding endurance-----	65
Tensile strength-----	12
Opacity-----	13
pH value-----	25
Not within weight tolerance-----	53
Excessive rosin-----	2
Unsatisfactory general appearance-----	96
Unsatisfactory color-----	16
Total-----	310

Determination in paper acidity.—The Division of Tests and Technical Control has cooperated with the Bureau of Standards and the paper-testing committee of the Technical Association of the Pulp and Paper Industry in drafting a proposed tentative T.A.P.P.I. method for determining the hydrogen-ion concentration. The Government Printing Office has continued to use the quinhydrone method. However, the glass-electrode method is also used in cases where check determinations are deemed advisable.

Further research is being conducted with the cooperation of the Bureau of Standards relative to standardizing the method for determination of pH in paper. The data gathered from future studies will be utilized in a revision of the proposed tentative T.A.P.P.I. method.

Deterioration of sulphite papers.—A study of relative rates of deterioration of paper containing varying percentages of bleached and unbleached sulphite pulp was made by means of periodical surveillance tests extending over 3 years of natural aging.

Microscopical examination.—In cooperation with the microscopic subcommittee of the Technical Association of the Pulp and Paper Industry, several stains for use in fiber identification and analysis have been investigated. A report dealing with this subject was presented by the Technical Director at the last annual meeting of this association. This report, entitled "Rapid Methods for the Determination of Bleached and Unbleached Fibers in Pulp and Paper", has been published in the Paper Trade Journal (vol. 98, no. 10, Mar. 8, 1934) and as Government Printing Office Technical Bulletin No. 20.

Tabulating-card paper.—Several experimental lots of paper for tabulating cards have been given complete tests. An attempt is being made to develop a paper to be used in the production of tabulating cards for permanent record files. The results so far obtained are gratifying, and further trial runs will be tested.

Opacity tester.—An instrument utilizing the photo-electric cell for measuring the opacity of paper has been investigated to ascertain its value for use in this Office. This instrument measures opacity by the contrast-ratio method as adopted by the Technical Association of the Pulp and Paper Industry. In addition, it measures actual printing opacity. It has been found that the photo-electric-cell instrument duplicates results and accurately checks the visual tester now in use.

Envelops.—During the year the number of envelops purchased totaled 56,096,225, an increase of 25,159,692 or 81.3 percent. Of these, 322,000 were rejected, or 12 rejections, comprising 0.57 percent, as compared with 16 rejections or 3.1 percent during the fiscal year 1933.

TYPE METALS

The total amount of type metal standardized during the fiscal year 1934 for the use of the Office was 7,553,895 pounds. This is a decrease of 969,343 pounds, or 11.4 percent, from last year.

The following is a comparison of the amounts of the various type-metal alloys standardized during the fiscal years 1933 and 1934:

Kind	1934	1933	Increase (+) or decrease (-)	
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Percent</i>
Linotype.....	4,459,588	5,742,697	-1,283,109	-22.3
Monotype.....	1,966,294	2,020,578	-54,284	-2.7
Stereotype.....	481,581	526,022	-44,441	-8.4
Electrotype.....	581,229	171,671	+409,558	+238.6
Slug.....	65,203	61,270	+3,933	+6.4
Total.....	7,553,895	8,522,238		

The following table shows the correction of linotype, monotype, stereotype, and electrotype metals for the fiscal year 1934, including the quantity returned for remelting, correction metals, dross, percentage increase due to correction, and percentage loss due to dross calculated on the quantity of metal remelted.

	Linotype	Monotype	Stereo- type	Electro- type	Slug
Returned for remelting.....pounds..	4,392,659	1,967,213	473,837	522,061	165,203
Correction metal used:					
Lead-antimony alloy ²do.....	7,280	1,293	175	4,680	-----
Tin-antimony alloy ³do.....	90	25,342	-----	200	-----
Tin.....do.....	339	3,009	-----	-----	-----
Lead.....do.....	82,970	1,032	8,445	54,288	-----
Total.....do.....	90,679	30,676	8,620	59,168	-----
Total corrected metal.....do.....	4,459,588	1,966,294	481,581	581,229	-----
Dross.....do.....	23,750	31,595	876	-----	-----
Increase due to correction.....percent..	2.06	1.55	1.82	11.33	-----
Loss due to dross.....do.....	.54	1.61	.18	-----	-----

¹ Remelted only; no correction required as it is used for "solid-body" work (metal base).

² Lead-antimony alloy consists of approximately 60 percent lead and 40 percent antimony.

³ Tin-antimony alloy consists of approximately 33 percent tin and 67 percent antimony.

The percentage of dross in linotype and monotype metals was 0.54 and 1.61, respectively, as compared with 0.65 and 2.22 last year.

Owing to the increased use of linotype metal necessitated by printing demands of the emergency agencies, the reserve supply of 200,000 pounds of this metal became exhausted. This required the purchase of 36,000 pounds of linotype "pigs" and the conversion of 28,585 pounds of stereotype and 20,430 pounds of monotype into 77,176 pounds of linotype metal.

During the fiscal year 88,212 pounds of old electrotype plates were corrected to the standard formula of 4 percent tin, 3.5 percent antimony, and 92.5 percent lead. This formula is identical with that adopted as the standard for electrotype backing metal by the International Association of Electrotypers. There were melted 393,237 pounds of shavings and trimmings separated from copper scraps and dross, and "pigged" for use in the Electrotype Section.

For the Ludlow machines, 12,990 pounds of metal, containing 6.5 percent tin, 11.5 percent antimony, and 82 percent lead, were made.

Purchase was made of 161,838 pounds of correction metals, for which 83,814 pounds of dross and 12,274 pounds of electrotype shells were accepted as partial payment.

Included in the total amount of monotype metal corrected is 95,715 pounds containing 10 percent tin, 19 percent antimony, and 71 percent lead. This hard monotype metal is used in rule casting and other special work where a harder metal than the standard alloy is required.

ELECTROTYPING

The semiautomatic copper-depositing tanks have now been in operation for 3 years, and have continued to give very satisfactory service.

The use of hot water instead of steam as a heating medium maintained the proper temperature of 90° F. without injury to the lead coil.

No changes were made in the operating conditions of the battery room during the year. All plating solutions were adjusted weekly under technical control.

Four hundred new electrotypes cases were made to replace those worn out by long and continual service. In order to permit more liberal "stopping-out" margins and thus avoid wasteful deposition of copper on the back of the cases, their dimensions were increased 1 inch, making the new case size 24 inches in length by 14 inches in width. Several alloys were cast into cases and given practical tests. An alloy containing 6 percent tin, 5 percent antimony, and 89 percent lead was chosen for the new cases.

Silvering wax molds.—Research undertaken to overcome the difficulties encountered in the deposition of silver films was continued.

The use of furfural as a wetting agent proved to be without value in correction of the tendency of the silver film to peel from the wax surface and develop side holes.

Silver films were deposited upon a special graphite-free molding medium to study their adhesion property in comparison with that of ozokerite wax. This special medium proved unsatisfactory owing to difficulty encountered in obtaining a clean separation of the mold from the type forms after the impression had been made and before silvering.

Solution of this problem depends upon obtaining perfect adherence of the silver film over the entire wax surface and its maintenance during the process of deposition of the copper shell upon the silver foundation. These conditions have not thus far been accomplished with sufficient frequency of success to assure commercial application.

INK

Owing to emergency work for the newly organized agencies of the Government and the greater demand by the other departments for mimeograph, stamp pad, numbering machine, printing, and writing inks, the work of the ink section materially increased. The total production of printing ink for the fiscal year 1934 was 179,749 pounds, an increase of 25,251 pounds, or 16.3 percent, over last year. The following comparative table shows the increased production of other ink products:

Material	Quantity produced			
	1934	1933	Increase	
				Percent
Blue toner.....quarts.....	13, 831	9, 867	3, 964	40. 2
Ruling ink.....pounds.....	2, 600	2, 006	594	29. 6
Writing ink, blue and red.....do.....	16, 460	12, 056	4, 404	36. 5
Striping ink, for tabulating cards.....do.....	422	316	106	33. 5

The ink section has also produced several miscellaneous materials for use of the Office, such as 193 pounds of marbling pulp colors, 299 pounds of molding wax compound, 228 quarts of lithographic plate etch, 140 quarts of lacquer thinner, 256 quarts of turpentine substitute, and 72 quarts of backing fluid.

A special ink and an overprint compound were developed for the Library of Congress for use on vulcanized fiber-board index cards. This ink is also suitable for use on tracing cloth and parchment drawing paper.

At the request of the Weather Bureau, a special brown copying ink was developed for printing air maps.

Research in the improvement of the quality of the inks manufactured by the Office has been conducted. Further work was done to simplify the specifications for lithograph varnish.

A blue-black writing ink for fountain pen and general office use, which is superior in quality to that formerly produced and which eliminates the difficulties of clogging and drying of the pen point, has been developed.

PRESS ROLLERS, GLUES, AND PASTE

A total of 3,494 press rollers was manufactured during the year, as compared with 2,985 in 1933, an increase of 509 rollers or 17 percent.

The tests on rubber rollers resulted in developing specifications for their purchase.

There were 77,225 pounds of molded glue manufactured during the year, as compared with 76,038 pounds last year.

Under the direction of this division, 19,000 pounds of glucose-glycol paste were prepared. This product has been very satisfactory in eliminating warping of book covers.

A total of 80,000 pounds of flour paste was also prepared.

SUPPLIES FOR GOVERNMENT AGENCIES

The total charge for materials furnished to other Government departments was \$28,457, as compared with \$19,280 last year, showing a substantial saving to the departments. The quantities of the supplies furnished in the fiscal years 1933 and 1934 are as follows:

Materials	1934	1933
	<i>Pounds</i>	<i>Pounds</i>
Mimeograph ink, black.....	60,804	46,650
Printing ink, black and colored, including mimeograph.....	6,426	4,791
Addressograph ink, blue and black.....	299	135
Writing ink, blue, black, and red.....	¹ 17,520	¹ 12,349
Stamp-pad and numbering-machine ink.....	3,022	1,460
Molded glue, including canceling-stamp composition.....	3,084	2,859
Paste.....	10,800	10,516

¹ Quarts.

PHOTO-ENGRAVING AND LITHOGRAPHIC RESEARCH

Research in these fields was principally devoted to improvement of the lithographic reproductions of half-tones from zinc offset plates. This study covered the development of high-light negatives best suited for offset printing and adaptation of the platemaking process to faithful reproduction of their characteristics.

Trichromatic-photography experiments were continued to determine new methods for improving the tricolor printing of marbled paper designs by the offset process.

New tentative specifications for the purchase of better quality materials for use in the processes were developed.

Half-tone negatives for offset printing.—Half-tone negatives incorporating varying degrees of contrast and representing a wide variety of types of copy were made both by customary methods and by unique procedures developed during the course of this investigation. Half-tone screens of 120 to 150 lines were employed. Test proofs from these negatives were obtained from the regular offset presses with various kinds of paper and with different qualities of ink.

Photomicrographs were made of some negatives to illustrate the character of dot formation and the consequent penetrability to light rays when printing upon the sensitized metal press plate. The light-filtering action of yellow stain in certain film negatives was also studied and the causes of the stains determined and removed.

Microscopic study of the negatives, offset press plates, and proofs indicated a pathway to improvements in the types of offset negatives and their adaptation, through improved technic, to better lithographic reproduction.

Several types of negatives were studied. The first high-light effects were obtained upon process film, using 120- and 133-line screens and a lens stop, specially designed by the Technical Division to produce a linked-dot pattern having somewhat of a line effect rather than the usual pattern obtained through the cross-lined screens. This pattern possesses an increased ratio of white to black areas, which results in a more contrastive print than formerly obtained when printed upon too thickly coated albumen plates. The sharply defined formation of the dots in process film negatives, exhibiting but slight opacity gradients, proved highly desirable for offset use.

However, such half-tone film negatives were not susceptible to reduction and intensification for altering the values of high lights and shadows, nor easily combined with type matter upon the same film. Their qualities were therefore imitated upon collodion wet plates, which permit such chemical modification after development.

Round stops were then substituted for the special stop and, by varying the standard distances of screen separation, additional contrastive effects of light and shade were obtained.

Silver bromide emulsion combined with hypersensitizing dyestuffs was employed to obtain further improvement in the contrastiveness of negatives and offset prints. The silver bromide process was found to possess certain intrinsic values which are not obtainable by the usual collodion silver iodide method. Owing to its greater sensitivity to light waves from the central region of the spectrum than the ordinary collodion which is partially "color-blind" to these wave lengths, the bromide when treated with color-sensitizing dyes was proven to be very valuable in obtaining contrastive negatives from yellow or discolored copy. The character of the dot formation upon silver bromide collodion is inherently better than any other photographic medium for producing offset half-tones. It possesses less opacity gradient and thus permits a greater latitude of exposure time during printing upon the albumenized metal plate. This is very desirable in the offset process, which requires line negatives, type matter upon process film, and half-tones to be printed simultaneously upon the same press plate.

This marks the introduction into the Government Printing Office of silver bromide emulsion to produce monochrome screen half-tones. Only 1 camera stop and 1 exposure may be employed in making silver bromide emulsion negatives instead of the 3 stops and 3 exposures used with plain collodion.

Variations in the technic of offset procedure were introduced simultaneously with variations in photographic procedure.

Improved copy for type matter and half-tones.—Special attention was also given to the preparation of type matter to be photographed by process film. It was found that offset paper presented a better surface for taking the ink with sharp impression than the 25-percent-rag bond paper heretofore used for obtaining photographic copy of type matter. The improved sharpness of impression of type faces on this paper resulted in marked improvement in the sharpness of the negatives prepared for offset reproduction. The "thins" in the type face were faithfully reproduced by refraining from chemically cutting the negatives with potassium ferricyanide hypo-reducer (Farmer's solution).

Considerable attention was given to the photographic copy for half-tone reproduction by retouching original photographs in order to facilitate obtaining better high-light effects in the negatives for offset printing.

Temperature-control bath for development of process film.—The critical sensitivity of certain process films to temperature variations during development necessitated the construction of a temperature-control bath for the development of offset negatives.

This apparatus consisted essentially of a water bath equipped with perforated brass pipes bearing roller rings to facilitate the movement of the developing trays. The trays were fabricated from stainless steel, an alloy of approximately 10 percent nickel, 20 percent chromium, and 70 percent steel, which has proved very resistant to corrosion by the developer used. To prevent corrosion it is necessary to avoid bimetallic elements which form electrolytic couples resulting in chemical decomposition of the developers. Therefore, the trays were made seamless by folding in the corners, thus avoiding the necessity of using other metals in forming joints.

The temperature of the developer is maintained at 69° to 70° F. by rapid thermal transfer through the metal trays to the water bath in which they are partly immersed. The temperature of the bath is maintained a few degrees below 70° F. by means of a continuous circulation through a thermostatic valve control of the diaphragm type, attached to both the warm-water and the ice-water pipe lines.

This bath has proved an invaluable aid in improving the quality of lithographic negatives made during the hot summer months.

Graining of offset plates.—A microscopic study was made of various types of graining produced on zinc press plates in an automatic graining machine by means of quartz sands of varying granulations. This investigation resulted in materially reducing the size of the plate grain, largely eliminating the microscopic scratches which proved detrimental to fine half-tone printing. This finer and more porous grain secured better adsorption of water, permitting a marked reduction of the water-ink ratio, with consequent improvement in the quality of the final print. Excessive water on the press plate tends to deaden the blackness and tonal quality of ink. This improved quality of plate grain also effected sharper and more colorful printing through avoidance of the formation of an ink emulsion caused by excessive amounts of water on the press plate.

Lithographic graining sand.—A scientific study has been undertaken to standardize flint and quartz sands employed for graining zinc offset plates. A preliminary investigation of the commercial grades on the market has revealed a great lack of uniformity in granulation and classification of particle sizes of sands supplied for this purpose. Microscopic examination has also revealed that there is a wider variety of crystalline structure than should

be permitted for graining zinc plates. The granular form has been found to vary within the same sample from slivers and platy crystals to those which possess no sharp cutting edges. Some sands have been found to possess even spherical and smooth surfaces.

In order to obtain uniformity of graining and accurately standardize the time required for the graining process, it is necessary to maintain as a constant the structural form and granulation of the sand used. It is with this end in view that the investigation has led to formulating the following tentative specifications for two of the grades of lithographic graining sand:

NO. 0 FLINT SAND

Quality.—Natural crystal quartz, containing not more than a trace of mineral salts, such as iron compounds, and free from foreign matter.

Crystalline structure.—Microscopically sharp cutting edges, reasonably free from platy crystals and slivers.

Granulation.—Not less than 90 percent shall pass through a 100-mesh screen and not more than 15 percent through a 200-mesh screen.

NO. 1 FLINT SAND

Quality.—Natural crystal quartz, containing not more than a trace of mineral salts, such as iron compounds, and free from foreign matter.

Crystalline structure.—Microscopically sharp cutting edges, reasonably free from platy crystals and slivers.

Granulation.—Not less than 100 percent shall pass through a 40-mesh screen, not less than 85 percent through a 60-mesh screen, not more than 25 percent through an 80-mesh screen, and not more than 5 percent through a 100-mesh screen.

Albumen coating.—A thinner coating of bichromated albumen upon the zinc plate was obtained by reduction of the viscosity of coating solution and by increasing the speed of whirling the plate during the coating and drying operation. The increased fineness of plate graining was also a factor in the reduction of thickness of the light-sensitive film. This reduction in the thickness of the albumen film resulted in increased susceptibility to actinic light, producing a very hard image under normal exposure without a tendency to swell and thicken up the work and one which endured longer press runs. These factors, combined with increased vacuum, which afforded better contact between the negative and printing plate, were responsible for reproducing by means of albumen coatings the patterns of the negatives with greater fidelity.

The greatly improved quality over previous offset half-tone printing in this Office resulted from the above outlined technical study and changes introduced into the processes during the past year. The practicality of this technical investigation was demonstrated in the recent publication, by the offset process, of 18 scenic booklets illustrating and describing national parks. These booklets comprise the 1934 series issued by the National Park Board of the Department of the Interior.

Lithographic etches.—Several formulas for lithographic plate etches have been compounded and their effects observed. An excellent formula, known as "white etch", has been supplied by this division. This etch has given uniformly satisfactory results for use on the plates while under operation. A chemical substitute for turpentine, which has displaced the use of that skin-irritant compound, has also been supplied. These two formulas have almost completely eliminated the use of chromic acid and turpentine, and

have resulted in more comfortable operating conditions and avoidance of industrial poisoning of press operators.

Marbled paper designs by offset printing.—By means of tricolor photography new designs were printed for use as end sheets in bookbinding. These designs included fine-comb marble, Italian marble, and peacock patterns. The printing was highly satisfactory. However, the red color of the pattern was somewhat degraded toward an orange shade, owing to the necessity of printing red over a yellow background. To avoid this procedure, a camera study of actual marbling with a view to separation of the red from the yellow by means of panchromatic emulsion and absorption filters was made.

It was determined that dyes of certain chroma (magenta, hansa yellow, and peacock blue) reflected light which was selectively absorbed by appropriate Wratten filters and thus completely separated upon the negatives. To obtain the yellow printing plate desired, it was necessary to photograph both the blue and the red ends of the spectrum and "drop out" the middle region of the yellow. This was possible in the case of dyes because of the definite wave length of light reflected, but could not be accomplished with the more complex pigments. Therefore, a new pigment which possesses the required photographic possibilities combined with the physical properties necessary to permit its use for flotation upon the gum baths employed in the marbling process was sought. An alizarine aluminum lake, a magenta pigment, was obtained as a substitute for the paranitraniline red used in the marbling process.

Preliminary tests indicate that this pigment, employed together with hansa yellow and peacock blue, will permit complete photographic separation, thus leading to a better reproduction of the original red colors by the elimination of the necessity of printing them over a yellow foundation.

BOOKBINDING RESEARCH

Bookbinding research was conducted by the Government Printing Office in cooperation with the Employing Bookbinders of America under the research associate plan.

Pyroxylin-treated fabrics.—Research on the pyroxylin-treated fabrics was continued during the past year, special attention being paid to the pyroxylin-impregnated fabrics. Comparable grades were secured from various manufacturers and tested for the purpose of securing data concerning their physical characteristics. As a result, the Division of Tests and Technical Control developed purchase specifications covering various qualities of pyroxylin-impregnated fabrics.

Texas specifications.—In October 1932 the State of Texas developed specifications for the materials entering into the manufacture of their State textbooks. The Research Division of the Employing Bookbinders of America has been testing such items as book paper, book cloth, binder's board, thread, super, drill, etc., for book manufacturers, in order to assist them in purchasing materials which will satisfactorily conform to the Texas specifications.

Laminated board.—Various substitutes for binder's board were subjected to technical and practical tests in the laboratory and bindery.

Specifications for the various grades of cover board used in bookbinding were drawn and have been adopted as commercial standards.

Book cloth.—The results of several years' cooperative research on book cloth have been published in Government Printing Office Technical Bulletin No. 21.

PUBLICATIONS

The following reports were prepared during the year by the Division of Tests and Technical Control:

1. Classification of United States Patents on Electrotyping, Technical Bulletin No. 19.

This classification gives brief abstracts of 270 patents on electrotyping issued from 1790 to January 1, 1934. Appreciation of the value of this publication to the electrotyping industry is expressed in a letter from the International Association of Electrotypers as follows: "Please be assured that this information will be of a great deal of value and your painstaking efforts will be appreciated by every member of our industry."

2. Rapid Methods for the Determination of Bleached and Unbleached Fibers in Pulp and Paper, Technical Bulletin No. 20.

Three rapid methods for the determination of percentages of bleached and unbleached fibers in pulp or paper are outlined. The results of the determinations made using these methods and the official bright stain are discussed.

3. Starch-Filled Book Cloth, Technical Bulletin No. 21.

Covers the research conducted by the Government Printing Office in the development of its specifications for book cloth and buckram and also the work done by the Employing Bookbinders of America in comparing various commercial grades of cloth. The Employing Bookbinders' cooperative phase of the work resulted in tentative commercial standards for the highly competitive grades of book cloth and buckram. The tentative specifications are subject to revision at a joint meeting to be held with the manufacturers of starch-filled bookbinding fabrics.

4. Government Printing Office Paper Tests and Their Significance, address by the Technical Director at annual meeting of American Pulp and Paper Mill Superintendents' Association.

Testing of paper for compliance with specifications adopted by the Joint Committee on Printing is one of the most important duties of the Division of Tests and Technical Control of the Government Printing Office. It consists of technical testing covering the microscopical, physical, and chemical requirements and the visual examination for comparison of the paper with standard samples, which show color, finish, formation, and cleanliness desired. The significance of the tests is discussed.

Copies of these publications may be obtained gratis upon request.

OTHER ACTIVITIES

As in previous years, the Division of Tests and Technical Control has rendered valuable assistance to the various Government departments in connection with paper, ink, glue, and other technical problems.

Detection of fraudulent visas.—The value of one phase of this service was demonstrated in a lawsuit of the United States against Samuel David Held and Jacob Katzkowitz, who were convicted in the United States district court at Brooklyn, N.Y., of perjury in entering the United States on fraudulent visas. The Division of Tests and Technical Control was requested by the Bureau of Immigration and Naturalization to test the paper of Held's visa. The Technical Director testified at the trial that the paper used in printing the visa was not of the same grade and quality as that used at alleged time of issue for printing visas by the Government Printing Office.

The Government Printing Office also offered evidence that the printing of Held's visa was not from the type used by the Office in printing United States visa.

This testimony, with that of the Bureau of Immigration and Naturalization, was so complete that on the second day of the trial the defendant changed his plea to "guilty." After hearing the testimony against Held, Jacob Katzkowitz, whose trial immediately followed, pleaded guilty.

Assistance rendered the American Newspaper Publishers' Association.—Since the cooperative research on newsprint and news ink with the mechanical department of the American Newspaper Publishers' Association was brought to a close April 30, 1933, the Division of Tests and Technical Control continued to assist this mechanical department with tests of newsprint, news inks, and type metals. During the fiscal year 1934, 85 samples, including newsprint, news ink, type metals and flux, were tested for members of the association.

Correspondence.—Numerous requests for information concerning a wide range of technical and trade subjects were made by commercial firms. The value of furnishing such information is reflected in numerous letters of appreciation.

Committee membership.—The Technical Director is a member of the paper specifications committee of the Joint Committee on Printing, the paper testing committee of the Technical Association of the Pulp and Paper Industry, the advisory committee of the Lithographic Technical Foundation on lithographic papers, and the advisory committee of the National Research Council on permanent papers. The Technical Director is also the representative of the Government Printing Office on the Standards Council of the American Standards Association, the Federal Specifications Board, and numerous Federal specifications committees.

Respectfully submitted.

M. S. KANTROWITZ,
Technical Director.



